

CLAIMS

What is claimed is new and desired to be protected by letters patent is set forth in the appended claims:

1. Apparatus and system for cooking, drying and peeling shellfish products comprising:
 - a) a fluid filled conk tank for separating the shellfish product from packing ice, sea shells and other such large objects; and
 - b) an automated means for transporting the crated product to said conk tank, dumping the shellfish product into said conk tank from the crate and removing the crate therefrom.

2. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising:
 - a) a boiler system for supplying heated brine and cooking the shellfish product therein; and
 - b) an automated means for transferring the shellfish product from said conk tank to said boiler system.

3. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising:

- a) at least one dryer for dehydrating the shellfish product; and
- b) an automated means for transferring the shellfish product from said boiler system to said dryer.

4. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising:

- a) at least one peeling device for removing the heads, shells and tails from the shellfish product; and
- b) an automated means for transferring the dried shellfish product from said dryer into said peeling device and for removing it therefrom;

5. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of separating shells and debris from finished product.

6. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of

grading product by size.

7. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising an automated means of packaging shells and dust.

8. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, wherein said automated means for transporting the crated product to said conk tank comprises:

- a) a conk tank conveyor system having a first loading end and a second dumping end, said dumping end extending above and beyond the edge of said conk tank;
- b) a dumping cage disposed proximal to said dumping end of said conveyor system positioned in a manner conducive to catching said crate after it falls off said dumping end so the open top portion of the crate is oriented towards said conk tank thereby emptying the contents of said crate therein, said dumping cage being substantially open so as not to restrict passage therethrough of said shellfish product; and
- c) a mechanical means for ejecting said crate from said dumping cage.

9. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, wherein said conk tank comprises:

- a) a watertight housing having sidewalls and an open top;
- b) a substantial quantity of water retained within said housing; and
- c) means for agitating said water and lighter objects within said conk tank.

10. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, wherein said boiler system comprises:

- a) a brine mixing tank including a means for introducing water therein and a means for introducing salt therein to create a brine solution of a predetermined concentration in which the shellfish product is to be cooked;
- b) a primary seafood boiler to retain brine obtained from said brine mixing tank and maintain said brine at a constant, predetermined temperature; and
- c) conduit communicating between said brine mixing tank and said primary seafood boiler for the selective transport of brine to the primary mixing tank.

11. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, wherein said boiler system further comprises one or more auxiliary boilers in line with said conduit for heating said brine to the desired temperature and storing it therein until called for to replenish used brine that has been removed from said primary seafood boiler

12. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, wherein said means for transferring the shellfish product from said conk tank to said boiler system is a substantially inclined conk tank conveyor having a first lower end located at a bottom portion of said conk tank positioned below said dumping cage, and a second, upper end extending above and beyond the opposing sidewall of said conk tank housing so as to extend over said primary seafood boiler thereby permitting the shellfish product to fall therein upon reaching the end of said conk tank conveyor.

13. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, wherein said primary seafood boiler further includes a means for agitating the brine and contents therein.

14. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 13, wherein said agitation means includes at least one paddle wheel at the surface of the brine to keep the shellfish product moving evenly therethrough.

15. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 13, wherein said agitation means includes at least one jet nozzle for circulating the brine and product within the boiler.

16. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, wherein said primary seafood boiler further includes means for selectively maintaining and monitoring a specific temperature of said brine therein.

17. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 10, wherein said primary seafood boiler further includes salinity monitoring sensors to assure that the seafood is being cooked in an adequate brine mix.

18. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said means for transporting said shellfish product from the said boiler system to said dryer is a seafood dryer conveyor having a first lower end disposed at a bottom portion of said primary seafood boiler beneath the drop area of the conk tank conveyor and a second end extending over and beyond the opposing sidewall where it assumes a substantially horizontal orientation and terminates upon introduction to said dryer.

19. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 18, wherein said seafood dryer conveyor further includes a plurality of high speed fans blowing over said conveyor for cooling the shellfish product and stopping the cooking process.

20. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 18, wherein said seafood dryer conveyor further includes a plurality of spreader bars traversing the width of said conveyor and disposed slightly thereabove at a height sufficient to permit individual pieces of

shellfish to pass thereunder but will prevent passage of stacked shellfish until it is residing on said conveyor rather on top of another shellfish thereby assuring the shellfish product is evenly spread thereon for more efficient cooling.

21. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 18, wherein said seafood dryer conveyor further includes a plurality of rakes for turning said shellfish product to further ensure the uniform cooling thereof.

22. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 18, wherein said seafood dryer conveyor is enclosed to prevent exposure to airborne contaminants.

23. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 18, further including a transport portion of said seafood dryer conveyor that is composed of a mesh-like belting to permit the passage of air therethrough.

24. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, further comprising a means for supplying heat to the dryers by capturing the heat generated by said boiling and broth systems and transferring it thereto.

25. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 24, wherein dryer heat supply means includes a manifold integral with said boiler system and in communication with the dryers to scavenge the heat from the heat generating boilers and transfer it thereto.

26. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 24, wherein said dryer heat supply further includes an air return system to return air to said boiler system from said dryers using fans or blowers to maintain constant air flow and recirculation.

27. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers include a means for moving and rotating said shellfish product within said dryers during the drying process.

28. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 27, wherein said product moving and rotating means is a vertically stacked conveyor system having a plurality of staggered, parallel conveyors spaced apart one above the other and moving in alternating directions, the shellfish product is introduced into the dryer on the top conveyor and falls off upon reaching the end thereof and lands on the subjacent conveyor thereby effectively rotating said shellfish product which then travels in the opposite direction until falling onto the conveyor subjacent thereto and the process continues as such until reaching the bottom conveyor that transports the shellfish product to another dryer or peeling device.

29. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 27, wherein said product moving and rotating means is a vertically stacked conveyor system having a plurality of staggered, parallel conveyors spaced apart one above the other and moving in alternating directions, the shellfish product is introduced into the dryer on the top conveyor and falls off upon reaching the end thereof and lands on the subjacent conveyor thereby effectively rotating said shellfish product which then travels in the opposite direction until falling onto the conveyor subjacent thereto and the process

continues as such until reaching the bottom conveyor that transports the shellfish product to said peeling device.

30. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 27, wherein said product moving and rotating device comprises a spiral platform having a substantially cylindrical chute extending medially therethrough wherein the orbital motion of the spiral platform spirals the shellfish product upwards until reaching the top where it enters said chute and falls to the bottom thereby rotating said product which is subsequently reloaded onto said spiral platform as the cycle repeats.

31. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers further include vacuum bars running along the bottom portion of said dryer to vacuum accumulated shells and shellfish product that may have fallen off the conveyors.

32. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers further include sensors to detect the moisture content within said shellfish product to ensure complete

dehydration with no pathogen traces.

33. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, further comprising a product transfer system which utilizes suction to vacuum said shellfish product from one device to another.

34. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 33, wherein said product transfer system is utilized to move said shellfish product from said spiral dryer to said peeler.

35. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 4, wherein said peeling device comprises:

- a) an inner compartment having a screened bottom;
- b) an outer compartment; and
- c) a blade member that spins within said inner compartment so that the cleaned shellfish product rides along the smooth walls of said inner compartment while the heavier uncleaned shellfish product falls onto said screened bottom to continue cleaning of de-shelling

process.

- d) separation of debris and shells from finished product by vacuum extraction and loading by-product into packages or drums;
- e) working in sequence with the dryer and product transfer system to grade product by size if so desired;
- f) optional auto-unload of finished product;
- g) an optional mobile tilting unit;
- h) an optional stationary stand;
- i) an optional screen sweeper; and
- j) optional air jets.

36. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, further comprising a broth processing system wherein used brine is extracted from said primary seafood boiler and transported to said broth processing system for preparation into a seafood flavored broth.

37. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 36, further comprising broth storage tanks for the storage of the finished broth product.

38. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 36, further comprising a broth packaging system to package said broth for the market.

39. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 2, further comprising a spray drying system wherein used brine is extracted from said primary seafood boiler and injected as a fine mist into a heated furnace where instantaneous crystallization occurs creating a solid product to be used as a seafood flavored salt.

40. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers further comprise conveyor rakes to stir said shellfish product during drying.

41. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 40, wherein moisture sensors activate said conveyor rakes.

42. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 41, wherein said dryers further include temperature control means.

43. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 42, wherein said temperature control means comprises:

- a) thermostats; and
- b) regulators.

44. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers further include air contaminate sensors for detecting potential contaminants and toxins within said dryer.

45. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 44, wherein an alarm and notification means is in communication with said air contaminate sensors to notify the operator of a potentially hazardous condition.

46. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers include video monitoring means to allow the operator to observe the operation within the dryers.

47. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 3, wherein said dryers further include rheostats.

48. Apparatus and system for cooking, drying and peeling shellfish products as recited in claim 1, further comprising a computerized monitoring system and central data base to oversee all operational phases of the present invention that may include:

- a) video and audio monitoring;
- b) chemical detection;
- c) product tracking;
- d) production schedules;
- e) gross weights of product;
- f) yields of product;
- g) critical control points;
- h) product water activity;

- i) moisture content sensors;
- j) heat sensors for air and water;
- k) heat, water and air flow control system;
- l) salinity monitoring;
- m) boiling/drying/peeling timers and controls;
- n) HACCP guidelines and regulations;
- o) FDA (Dept> of Health) inspection and production forms;
- p) quality control;
- q) system and process troubleshooting;
- r) tips for GMP's;
- s) raw product testing;
- t) alarms and notification;
- u) product (size) grading;
- v) thermostats;
- w) regulators;
- x) LED control panel; and
- y) rheostats.

49. A dumping cage for discharging crated seafood product into a conk tank comprising:

- a) means for receiving said crated seafood product;
- b) means for displacing the crate whereby the crate is up-ended to discharge the contents; and
- means for removing the crate from the receiving means.

50. A product delivery apparatus for conveying crated seafood product to a conk tank comprising:

- a) means for receiving said crated seafood product; and
- b) means for elevating said crated seafood product to the upper rim of a conk tank.

51. A system for delivering raw crated seafood product and discharging said product into a conk tank comprising:

- a) a product delivery apparatus; and
- b) a dumping cage for discharging said crated seafood into a conk tank.

52. a conk tank incorporating at least one of;

- a) means for circulating water under pressure;
- b) means for testing the raw seafood product;
- c) means for agitating the contents of said tank;
- d) means to prevent passage of ice while transferring raw seafood product therefrom; and
- e) sensors means incorporated therein for detecting foreign substances and chemicals within said tank.

53. means for processing raw seafood product comprising:

- a) means for delivering raw seafood product to a heated receptacle having a brine solution therein;
- b) means for heating said apparatus; and
- c) means for recovering heat from said apparatus.

54. The process as recited in Claim 53 wherein said delivery of said raw seafood product is taken from the list of lift basket and conveyor belt.

55. The process as recited in Claim 54 wherein said lift basket is comprised of:

- a) means for supporting a receptacle having raw seafood product therein;
- b) means for conveying said receptacle to the product input aperture of said boiler; and
- c) means for discharging the raw seafood product from said receptacle into said boiler.

56. The process as recited in Claim 54 wherein said conveyor belt is comprised of:

- a) a continuous belt extending between two distal ends having motorized means for rotating said belt between said distal ends; and
- b) one distal end of said conveyor belt terminates at the input aperture for said boiler.

57. The process as recited in Claim 53 further comprising a brine mixing tank in communication with said heated receptacle.

58. The process as recited in Claim 53 further comprising auxiliary tanks for holding a brine solution in communication with said heated receptacle.

59. The process as recited in Claim 53, further comprising means for drying the processed seafood from said heated receptacle.

60. The process as recited in Claim 59, incorporating means for recirculating heat from the drying to the boiling process.

61. The process as recited in Claim 53, wherein the brine solution is transferred under predetermined conditions to a broth processing system.

62. The process as recited in Claim 61, wherein the broth processing system is comprised of:

- a) storing the broth in tanks; and
- b) packaging the broth.

63. The process as recited in Claim 53 further comprising sealed conduit in communication with said heated receptacle whereby air passing through said conduit is heated.

64. The process as recited in Claim 53 further comprising a spray drying system wherein brine is extracted from the heated receptacle and injected into a heated furnace or hopper as a fine mist where it is almost immediately dehydrated thereby creating a solid product to be used as a seafood flavored salt or additive.

65. A broth processing system wherein the brine solution from a seafood boiler is transported to holding tanks prior to packaging as a brine broth.

66. A food flavoring byproduct system wherein the brine solution from a seafood boiler is extracted from the heated receptacle and injected into a heated furnace or hopper as a fine mist where it is almost immediately dehydrated thereby creating a solid product to be used as a seafood flavored salt or additive.

67. A peeling device in communication with a dryer, wherein said peeling device is comprised of:

- a) a loading device
- b) a screen sweeper
- c) a blade; and
- d) a tilting unit

68. A peeling device in communication with a dryer, wherein said peeling device is comprised of:

- a) a stationary stand;
- b) an unloading device;
- c) a blade; and
- d) a screened aperture providing access.

69. A spiral conveyor dryer in communication with a peeling device, wherein said spiral dryer cycles the product from a low end to a high end as heated air is passed over said product before dropping said product to the low end.

70. A stacked conveyor dryer in communication with a peeling device, wherein said stacked conveyor drier moves the product from one level to another as heated air is passed over said product.